

09870406 010702

I hereby certify that this correspondence is being deposited with the United States Postal Service first class mail in an envelope addressed to:  
Assistant Commissioner for Patents, Washington, D.C. 20231, on

November 20, 2001

LAW OFFICES OF JONATHAN ALAN QUINE

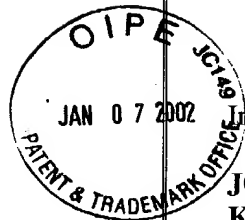
By:

Chianti Apple

Atty Docket No: 407T-907720US

Client Ref: 2000-453-3

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**



In re application of:

**JOHN CLARK LAGARIAS, TAKAYUKI  
KOICHI, NICOLE FRANKENBERG,  
GREGORY A. GAMBETTA, and  
BERONDA L. MONTGOMERY**

Application No.: **09/870,406**

Filed: **5/29/2001**

For: **HY2 FAMILY OF BILIN  
REDUCTASES**

Examiner: unassigned

Art Unit: unassigned

**PRELIMINARY AMENDMENT TO  
ACCOMPANY RESPONSE TO  
NOTICE OF MISSING PARTS.**

Assistant Commissioner for Patents  
Washington, D.C. 20231

Dear Sir:

This is a preliminary amendment to accompany the Notice of Missing Parts mailed August 2, 2001.

The following documents are enclosed herewith:

- 1) A petition to extend the period of response for two months months;
- 2) A copy of the Notice of Missing Parts; and
- 3) A sequence listing paper copy and computer readable format (CRF).

Please amend the specification and claims as follows

**In the Specification.**

Please delete the sequence listing.

After the abstract, please insert the accompanying sequence listing (pages 1-40).

Delete the paragraph at page 12, line 33 through page 13, line 19, and insert the following:

--Figures 3A-and 3B illustrate the *HY2* locus of Arabidopsis. Figure 3A shows a map of the region of chromosome 3 containing *HY2*. Two distinct mapping populations were screened, and mapping results with molecular markers are summarized schematically, indicating that *HY2* lies in a region 66 kb in length. Markers starting with the letter c are CAPS markers developed during this study. DNA sequence information for bacterial artificial chromosomes (BACs) MZB10 and F3L24 is available in GenBank/EMBL/DDBJ. The *HY2* gene structure with mutations is illustrated at the bottom. Exons are depicted as dark boxes and thick lines, which reflect coding regions and 59/39 untranslated regions, respectively. Dotted lines indicate introns. Figure 3B shows the genomic sequence of *HY2* (SEQ ID NO:32) and the deduced *HY2* protein sequence (SEQ ID NO:33) from the Columbia (Col) ecotype. Uppercase letters represent exons determined by sequence analysis of *HY2* cDNAs. Introns and spacer sequences are indicated with lowercase letters. The stop codon is double underlined. Mutations in *hy2* alleles are shown in boldface letters. Single nucleotide polymorphisms in both Ler and Wassilewskija (Ws) ecotypes include the following: inserted T (at nucleotide 234), G364T conversion with amino acid change to Asn, and G1182A conversion (silent). Single nucleotide polymorphisms in the Ler ecotype only include the following: C515A (in intron), G884A (silent), C1145T (in intron), and G1717A (in intron). The single nucleotide polymorphism in Ws ecotype only is C1910T (silent).--

Delete the paragraph at page 13, line 25 through page 14, line 13, and insert the following:

--Figure 5 shows an alignment of *HY2* and *HY2*-Related Proteins. Alignment of the *HY2* protein (SEQ ID NO:34) with proteins of unknown function from oxygenic photosynthetic bacteria identified by PSI BLAST. Conserved residues in 100 or 80% of the aligned sequences are depicted in the consensus sequence with uppercase or lowercase letters, respectively. Sequence similarity groups shown in the consensus sequence reflect conservation in 100% of the sequences. These are labeled as follows: 1, D 5 N; 4, R 5 K; 5, F 5 Y 5 W; and 6, L 5 I 5 V 5 M. Dark shading with white letters, gray shading with white letters, and gray shading with black letters reflect 100, 80, and 60% sequence conservation, respectively. Sequence identifiers correspond to hypothetical proteins from *Synechococcus* sp WH8020 (YCP2\_SYNPY (SEQ ID NO:35) and YCP3\_SYNPY (SEQ ID NO:36)), from *Prochlorococcus* (YHP2\_PROMA (SEQ ID NO:37) and YHP3\_PROMA (SEQ ID NO:38)), and from *Synechocystis* sp PCC 6803 gene (cyanobase locus slr0116 (SEQ ID NO:39); see <http://www.kazusa.or.jp/cyano/cyano.html>). Database accession numbers are AB045112 for *HY2*

App. No: (%Serial No%)

Page 3

(DDBJ), Q02189 for YCP2\_SYNPY (SWISSPROT), Q02190 for YCP3\_SYNPY (SWISSPROT), CAB95700.1 for YHP2\_PROMA (EMBL), CAB95701.1 for YHP3\_PROMA (EMBL), and S76709 for slr0116 (Protein Information Resource). Asterisks are indicated every 20 residues.--

Delete the paragraph at page 15, lines 1-27, and insert the following:

--Figure 10 shows a multiple sequence alignment of the identified bilin reductases. All identified sequences were aligned using the programs CLUSTAL W and MEME. Conserved residues in 90 or 70% of the aligned sequences are depicted in the consensus sequence with uppercase or lowercase letters, respectively. Sequence similarity groups, labeled 1 (D, E), 2 (R, K), 3 (F, Y, W), and 4 (L, I, V, M), shown in the consensus sequence reflect conservation in >90% of the sequences. Dark shading with white letters, gray shading with white letters, and gray shading with black letters reflect 90, 70, and 50% sequence conservation, respectively. SYNY3, *Synechocystis sp* PCC6803; SYNPY, *Synechococcus sp* WH8020; SYN81, *Synechococcus sp* WH8102; PROMA, *Prochlorococcus sp* SS120; PROME, *Prochlorococcus sp* MED4; NOSPU, *Nostoc punctiforme*; ANASP, *Anabaena sp* PCC7120; ARATH, *Arabidopsis thaliana*; and HORVU, *Hordeum vulgare*. Database accession numbers are GB: AF339056 for PcyA\_ANASP (SEQ ID NO:40) (CyanoBase contig 362), GB: AF339057 for PcyA\_NOSPU (SEQ ID NO:41) (JGI contig 632), PIR: S76709 for PcyA\_SYNY3 (SEQ ID NO:42), PcyA\_SYN81 (SEQ ID NO:43) is on JGI contig 51, GB: AF352050 for PcyA\_PROME (SEQ ID NO:44) (JGI contig 26), SW: Q02189 for PebA\_SYNPY (SEQ ID NO:45), PIR: S31075 (fragment)/ JGI contig 72 for PebA\_SYN81 (SEQ ID NO:46), EMB: CAB95700.1 for PebA\_PROMA (SEQ ID NO:47), PebA\_PROME (SEQ ID NO:48) is on JGI contig 26, GB: AF352049 for PebA\_NOSPU (SEQ ID NO:49) (JGI contig 622), SW: Q02190 for PebB\_SYNPY (SEQ ID NO:50), PebB\_SYN81 (SEQ ID NO:51) is on JGI contig 72, EMB: CAB95701.1 for PebB\_PROMA (SEQ ID NO:52), PebB\_PROME (SEQ ID NO:53) is on JGI contig 26, GB: AF339058 for PebB\_NOSPU (SEQ ID NO:54) (JGI contig 622), DDBJ: AB045112 for HY2\_ARATH (SEQ ID NO:55), EMB: CAB77705.1 for RCCR\_HORVU (SEQ ID NO:56), EMB: CAB16763.1 for RCCR\_ARATH (SEQ ID NO:57). Asterisks indicate every tenth amino acid; dashes indicate gaps; numbers above the line indicate amino acid sequence numbering starting with number one.--

App. No: (%Serial No%)

Page 4

In accordance with 37 CFR §1.121 a marked up version of the above-amended paragraph(s) illustrating the changes introduced by the forgoing amendment(s) are provided in Appendix A.

### REMARKS

#### Sequence Listing Rules.

This amendment is provided to comply with sequence listing rules, 37 C.F.R. §§ 1.821-1.825. A disk containing the required sequence(s) in computer readable form, and a paper copy of the sequence information that has been printed from the floppy disk are provided herewith. The information contained in the computer readable disk was prepared through the use of the software program "PatentIn" and is identical to that of the paper copy. The amendments introduce no new matter. They are made to provide appropriate cross-references to the SEQ ID NOS as required under 37 C.F.R. §§ 1.821-1.825. The sequences contained in the sequence listing are found in the application as filed.

If a telephone conference would expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (510) 337-7871.

LAW OFFICES OF JONATHAN ALAN QUINE  
P.O. BOX 458  
Alameda, CA 94501  
Tel: 510 337-7871  
Fax: 510 337-7877

Respectfully submitted,



Tom Hunter  
Reg. No: 38,498

**APPENDIX A**  
**VERSION WITH MARKINGS TO SHOW CHANGES MADE IN 09/870,406 WITH ENTRY OF**  
**THIS AMENDMENT**

**In the specification:**

Page 12, line 33 through page 13, line 19:

--Figures 3A-and 3B illustrate the *HY2* locus of Arabidopsis. Figure 3A shows a map of the region of chromosome 3 containing *HY2*. Two distinct mapping populations were screened, and mapping results with molecular markers are summarized schematically, indicating that *HY2* lies in a region 66 kb in length. Markers starting with the letter c are CAPS markers developed during this study. DNA sequence information for bacterial artificial chromosomes (BACs) MZB10 and F3L24 is available in GenBank/EMBL/DDBJ. The *HY2* gene structure with mutations is illustrated at the bottom. Exons are depicted as dark boxes and thick lines, which reflect coding regions and 59/39 untranslated regions, respectively. Dotted lines indicate introns. Figure 3B shows the genomic sequence of *HY2* (**SEQ ID NO:32**) and the deduced *HY2* protein sequence (**SEQ ID NO:33**) from the Columbia (Col) ecotype. Uppercase letters represent exons determined by sequence analysis of *HY2* cDNAs. Introns and spacer sequences are indicated with lowercase letters. The stop codon is double underlined. Mutations in *hy2* alleles are shown in boldface letters. Single nucleotide polymorphisms in both Ler and Wassilewskija (Ws) ecotypes include the following: inserted T (at nucleotide 234), G364T conversion with amino acid change to Asn, and G1182A conversion (silent). Single nucleotide polymorphisms in the Ler ecotype only include the following: C515A (in intron), G884A (silent), C1145T (in intron), and G1717A (in intron). The single nucleotide polymorphism in Ws ecotype only is C1910T (silent).--

Page 13, line 25 through page 14, line 13:

--Figure 5 shows an alignment of *HY2* and *HY2*-Related Proteins. Alignment of the *HY2* protein (**SEQ ID NO:34**) with proteins of unknown function from oxygenic photosynthetic bacteria identified by PSI BLAST. Conserved residues in 100 or 80% of the aligned sequences are depicted in the consensus sequence with uppercase or lowercase letters, respectively. Sequence similarity groups shown in the consensus sequence reflect conservation in 100% of the sequences. These are labeled as follows: 1, D 5 N; 4, R 5 K; 5, F 5 Y 5 W; and 6, L 5 I 5 V 5 M. Dark shading with white letters, gray shading with white letters, and gray shading with black letters reflect 100, 80, and

App. No: (%Serial No%)

Page 6

60% sequence conservation, respectively. Sequence identifiers correspond to hypothetical proteins from *Synechococcus* sp WH8020 (YCP2\_SYNPY (SEQ ID NO:35) and YCP3\_SYNPY (SEQ ID NO:36)), from *Prochlorococcus* (YHP2\_PROMA (SEQ ID NO:37) and YHP3\_PROMA (SEQ ID NO:38)), and from *Synechocystis* sp PCC 6803 gene (cyanobase locus slr0116 (SEQ ID NO:39); see <http://www.kazusa.or.jp/cyano/cyano.html>). Database accession numbers are AB045112 for HY2 (DDBJ), Q02189 for YCP2\_SYNPY (SWISSPROT), Q02190 for YCP3\_SYNPY (SWISSPROT), CAB95700.1 for YHP2\_PROMA (EMBL), CAB95701.1 for YHP3\_PROMA (EMBL), and S76709 for slr0116 (Protein Information Resource). Asterisks are indicated every 20 residues.--

Page 15, lines 1-27:

--Figure 10 shows a multiple sequence alignment of the identified bilin reductases. All identified sequences were aligned using the programs CLUSTAL W and MEME. Conserved residues in 90 or 70% of the aligned sequences are depicted in the consensus sequence with uppercase or lowercase letters, respectively. Sequence similarity groups, labeled 1 (D, E), 2 (R, K), 3 (F, Y, W), and 4 (L, I, V, M), shown in the consensus sequence reflect conservation in >90% of the sequences. Dark shading with white letters, gray shading with white letters, and gray shading with black letters reflect 90, 70, and 50% sequence conservation, respectively. SYNY3, *Synechocystis* sp PCC6803; SYNPY, *Synechococcus* sp WH8020; SYN81, *Synechococcus* sp WH8102; PROMA, *Prochlorococcus* sp SS120; PROME, *Prochlorococcus* sp MED4; NOSPU, *Nostoc punctiforme*; ANASP, *Anabaena* sp PCC7120; ARATH, *Arabidopsis thaliana*; and HORVU, *Hordeum vulgare*. Database accession numbers are GB: AF339056 for PcyA\_ANASP (SEQ ID NO:40) (CyanoBase contig 362), GB: AF339057 for PcyA\_NOSPU (SEQ ID NO:41) (JGI contig 632), PIR: S76709 for PcyA\_SYNY3 (SEQ ID NO:42), PcyA\_SYN81 (SEQ ID NO:43) is on JGI contig 51, GB: AF352050 for PcyA\_PROME (SEQ ID NO:44) (JGI contig 26), SW: Q02189 for PebA\_SYNPY (SEQ ID NO:45), PIR: S31075 (fragment)/JGI contig 72 for PebA\_SYN81 (SEQ ID NO:46), EMB: CAB95700.1 for PebA\_PROMA (SEQ ID NO:47), PebA\_PROME (SEQ ID NO:48) is on JGI contig 26, GB: AF352049 for PebA\_NOSPU (SEQ ID NO:49) (JGI contig 622), SW: Q02190 for PebB\_SYNPY (SEQ ID NO:50), PebB\_SYN81 (SEQ ID NO:51) is on JGI contig 72, EMB: CAB95701.1 for PebB\_PROMA (SEQ ID NO:52), PebB\_PROME (SEQ ID NO:53) is on JGI contig 26, GB: AF339058 for PebB\_NOSPU (SEQ ID NO:54) (JGI contig 622), DDBJ: AB045112 for HY2\_ARATH (SEQ ID NO:55), EMB: CAB77705.1 for RCCR\_HORVU (SEQ ID NO:56), EMB: CAB16763.1 for RCCR\_ARATH (SEQ ID NO:57).

